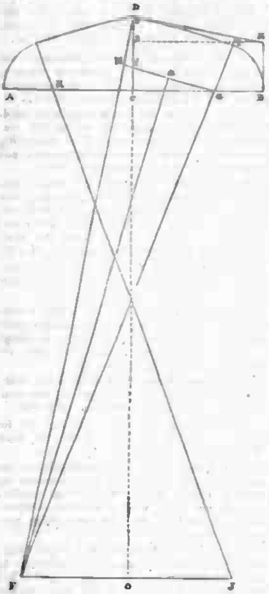
ARCHITECTURAL GEOMETRY, No. II.— TUDOR ARCHES.

TO THE EDITOR OF THE BUILDER.

SIR,—Beneath is a method of finding the centres for describing the Tudor arch to any width and height: it is not a solution of the proposition given by a "Subscriber from the Beginning;" it may, however, be of service.

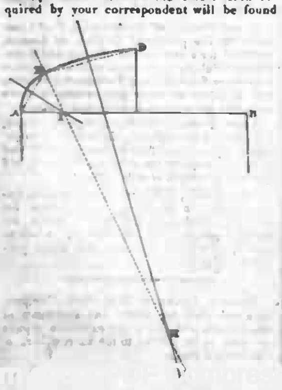


Let A B be the springing line, and C D the height of the arch; draw B E perpendicular to A B, and make it equal to two-thirds of the height C D; join E D, and draw D F perpendicular to E D; make B G and D H each equal to B E; join G H, and from the middle of G H draw *a* F perpendicular to G H, meeting D F in F; then F and G are the centres for describing the curves, and the two arcs will meet in the line F G I, which passes through their centres. By drawing F J parallel to A B, and producing O C to O, the centres for the other side of the arch will be found by making J O equal to F O, and A K equal to B C.—I am, Sir, yours, &c.,

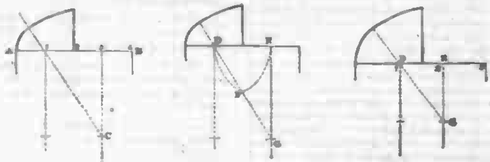
Liverpool, June, 1844. H. W.

ARCHITECTURAL GEOMETRY.—No. III.

SIR,—The centres of the Tudor arch required by your correspondent will be found as follows. Join A E and E D, and bisect them; the intersection of the bisecting line of A E with the base A B will give the centre, I, of the arc A E. Through E I draw the indefinite line E H, and the intersection of the bisecting line of E D with this indefinite line will give the centre, H, of the arc E D.



I believe, however, the ancient Freemasons did not work on this principle; they did not fix by arbitrary choice the width and height of their arches. By a careful study of the existing arches, it will be found that the central points are determined by geometrical proportions. The base was divided into a certain number of parts, three, four, five, or six, or more, the first division of which gives the centre of the springing of the arch. The other centres are formed on lines let fall perpendicularly on these points from the base line in some definite proportion, as follows:—



In the first figure the base is divided into four parts, and the second centre, C, is three parts distant from the base line.

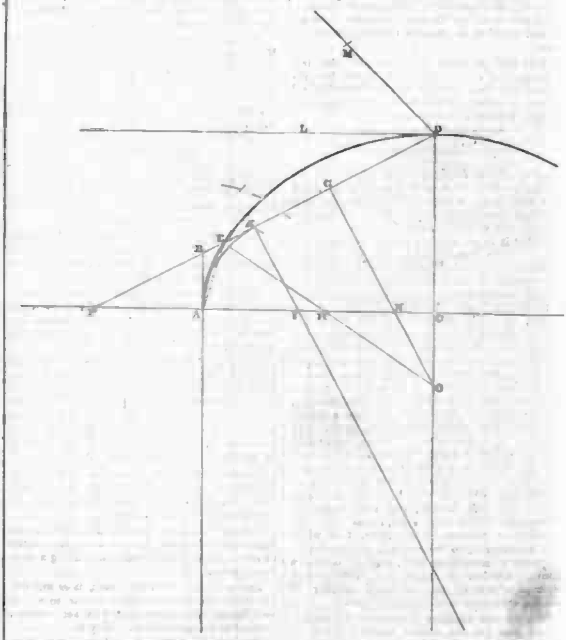
In the second example, the second centre is found by drawing the line D G through the apex of the equilateral triangle D F E.

In the third, the distance E G is the diagonal of the square D E: this I found from a doorway at Croydon Palace.

The above will be sufficient to shew to students the infinite variety of form which may be obtained by geometrical proportion. The old architects did not trust to the "rule of thumb."—I am, Sir, yours, &c., T. L.

ARCHITECTURAL GEOMETRY.—No. IV.

SIR,—In your last number a correspondent requests the solution of a problem on the Tudor arch. The following is a method of drawing Tudor arches from similar data.



A C half the width of the arch, C D height, D F direction of the chord of the upper arch.

Produce C A indefinitely to the left, produce D F till it meets the horizontal line C A in F. Draw A B perpendicularly to C A, make B K=A B. Draw K I perpendicular to D F, then will I be the centre of a circle to which D F forms a tangent, and the half arch A K D is one of the limits of the problem, the radius of the upper part K D being infinite, and therefore the curvature is nothing measurable.

Again, draw D L parallel to F C, and make the angle to D M = half a right angle. Draw A E, making an angle with C A = G D M, bisect [illegible] Draw G O perpendicular to F D, cutting D C produced in O. Join E O, cutting I C in H, thus will H and O be the centres of an arch which is the other limit of the problem, between which limits an infinite number of Tudor arches may be described, which will answer the conditions of the problem, so that any radius less than A H and greater than A I will be the radius of the lower part of the Tudor arch agreeing with the *data*. The arch will be more or less pointed as the centre of the lower portion is chosen near to or remote from I.

The demonstration of the first limit is apparent, but the last is not so, and it therefore remains to be proved that the angle A E H is isosceles or the side [illegible] A = to the side H E.